Certified Reference Material Fertilizer B
Low-analysis Compound Fertilizer
FAMIC-B-24
No. +++
Certificate (Sample)

This certified reference material (CRM) is produced by grinding a compound fertilizer specified in the official specifications of ordinary fertilizers to be homogenized. This CRM is intended for use in a quality control of analyses and the validation of analytical methods, etc., in the quantitation of major components in compound fertilizers.

[Certified values]
The certified values for elements in this CRM are as shown in Table 1. The uncertainty of the certified value is the expanded uncertainty obtained by multiplying the combined standard uncertainties, which is obtained in a collaborative study to determine the certified value, by the coverage factor (k = 2). The number of digits to be expressed is up to the order of the minimum limit of quantification in the “Testing Methods for Fertilizers”.

Table 1 Certified Value

Component	Content Mass Fraction (%)	Expanded Uncertainty ($U_{95\%}$) Mass Fraction (%)
Ammoniacal nitrogen (A-N)	9.85	0.08
Nitrate nitrogen (N-N)	4.11	0.14
Citrate-soluble phosphoric acid (S-P_2O_5)	5.04	0.04
Water-soluble phosphoric acid (W-P_2O_5)	3.86	0.04
Water-soluble potassium (W-K_2O)	8.08	0.08

Component	Content (mg/kg)	Expanded Uncertainty ($U_{95\%}$) (mg/kg)
Arsenic (As)	4.5	0.2
Cadmium (Cd)	3.4	0.1
Nickel (Ni)	7.2	0.2
Chromium (Cr)	32	1

[Analytical methods]
Analysis is according to the "Testing Methods for Fertilizers". Analytical methods for respective components are as shown in Table 2.

Table 2 Analytical Methods

Component	Testing Methods for Fertilizers	Minimum amount of Analytical Sample for 1 Analysis (g)
Ammoniacal nitrogen (A-N)	4.1.2.a Distillation method	2.5
Nitrate nitrogen (N-N)	4.1.3.a Devarda's alloy - distillation method	1
	4.1.3.c Phenol sulfuric acid method	1
Citrate-soluble phosphoric acid (S-P_2O_5)	4.2.2.a Ammonium vanadomolybdate absorptiometric analysis	2.5
	4.2.2.c ICP Optical Emission Spectrometry	2.5
Water-soluble phosphoric acid (W-P_2O_5)	4.2.4.a Ammonium vanadomolybdate absorptiometric analysis	2.5
	4.2.4.d ICP Optical Emission Spectrometry	2.5
Water-soluble potassium (W-K_2O)	4.3.3.a Flame atomic absorption spectrometry or flame photometry	2.5
	4.3.3.d ICP Optical Emission Spectrometry	2.5
Arsenic (As)	5.2.a Hydride generation atomic absorption spectrometry	1*
	5.2.b Silver diethyl dithiocarbamate absorptiometric analysis	1*
Cadmium (Cd)	5.3.a Flame atomic absorption spectrometry	5
	5.3.e ICP Optical Emission Spectrometry (Internal standard method)	5
Nickel (Ni)	5.4.a Flame atomic absorption spectrometry	5
	5.4.e ICP Optical Emission Spectrometry (Internal standard method)	5
Chromium (Cr)	5.5.c Flame atomic absorption spectrometry (Fertilizers not containing organic matters)	1

*The sample amount was set to 1 g because the same sample solution was used as for chromium during the collaborative study.

For details of analytical methods for components shown above, see the "Testing Methods for Fertilizers" disclosed in the website of the Food and Agricultural Materials Inspection Center.
URL for the above mentioned method: Testing Methods for Fertilizers
http://www.famic.go.jp/ffis/fert/obj/shikenho/shikenho_2024.pdf

[Method to determine the certified value]
A collaborative study by 15 laboratories was conducted from August 27th to November 1st, 2024.
The mean of the quantitation value in the collaborative study was determined as the certified value.
In the calculation of the mean, the Cochran test at the one-sided significance level of 1 % and the Grubbs test at the two-sided significance level of 1 % were conducted to exclude outliers.

[Metrological traceability]
The certified value of the reference material is the mean of the quantitation value in the collaborative study conducted by the “Testing Methods for Fertilizers”, for which the validity of the test method has been confirmed, ensuring "metrological traceability" as described in JIS Q 17025, Section 6.5.

[Date of certification] February 18, 2025

[Expiration of certification]
This certification is valid for two years under the storage conditions shown below. Moreover, when change arises in the certified value by deterioration unexpected in the term of validity etc., it will be published on the FAMIC website.

[Description of the material]
This CRM is powder that passed through a sieve of 500 μm aperture, and is sealed in a brown glass bottle. The content is about 150 g.

[Purpose of use]
This CRM is the environmental certified reference material for measuring fertilizer components using “Testing Methods for Fertilizers”, and its main purposes are as follows:

- Confirmation of the validation of analytical methods or analytical equipment
- Quality control of analyses

[Instructions for storage]
Store the reference materials at normal temperature (20 ℃±15 ℃) and protect them from direct sunlight, high temperature and high humidity. After opening, make sure to close the inner lid, and store sealed as much as possible.

[Instructions for use]
Care should be taken to avoid injury when opening.
After opening, if the reference material becomes contaminated or deteriorated, it cannot be used as a certified reference material.
After using the reference material, do not leave the container open, and immediately close the inner lid.
The amount to be used in one analysis is shown in Table 2.
Moreover, the plants grown using this reference material are not to be served as food.

[Manufacturing method]
The reference material was prepared by the following processes using a commercially available low-analysis compound fertilizer produced using calcium ammonium nitrate fertilizer, ammonium sulfate, ammonium phosphate, potassium sulfate and fritted trace elements fertilizer. Eighty (80) kg of the low-analysis compound fertilizer was crushed until it passed through a sieve with a 500 μm aperture, homogenized, and approximately 150 g was sealed in a brown glass bottle.

[Reference information]
Since all certified values of this CRM are based on the amount of moisture, the moisture value is shown as a reference value.

Table 3 Reference Value

Component	Reference Value Mass Fraction (%)	Expanded Uncertainty ($U_{95\%}$) Mass Fraction (%)
Moisture	1.4	0.1

[Acquisition of information]
Changing the certified value or the like, as well as notify the purchaser if there is significant revision, is posted on the website below.
It should be noted that, with respect to technical information on how such use of this standard is to be referred to Annex "Using this certified reference substance".
URLs for the above website: http://www.famic.go.jp/ffis/fert/sub6.html

[Contact center for the certified reference material]
Analysis Fertilizer and Soil Amendments Division, Fertilizer and Feed Inspection Department,
Headquarters, Food and Agricultural Materials Inspection Center
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